



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
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P7300-50

Job Sheet 197799



Part No: P7300-50

Job Qty: 10 pcs

Part Name: Plasma® Long Line 7,300 lbs Safe Work Load (3,300 kg)



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 7/16/19

Job Tracking No:

Due Date: 8/12/19

Created By: Chantal Lavoie

Type: Stock

Description:

Note: DWG p### REV 1 IPP REV A 19.07.16 NEW ISSUE VERF:JFS

Ship Via:

DAS
35
8-89

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier	Lead Time	
110	Purchasing	10 pcs	8/12/19	8/12/19	0.00	0.00	Purchasing - 1		AUG 1 2 2019
							Purchasing - 2		
							Purchasing - 3		
120	Packaging 2-1 - Receive - B4B	10 pcs	8/12/19	8/12/19	0.00	0.00	Packaging 2 - 1 - B4B		AUG 1 2 2019
							Packaging 2 - 2 - B4B		
							Packaging 2 - 3 - B4B		
							Packaging 2 - 5 - B4B		
							Packaging 2 - 4 - B4B		
							Packaging 2 - 6 - B4B		
							Packaging 2 - 7 - B4B		
							Packaging 2 - 8 - B4B		
							Packaging 2 - 9 - B4B		
							Packaging 2 - 10 - B4B		
							Packaging 2 - 11 - B4B		
							Packaging 2 - 12 - B4B		
							Packaging 2 - 13 - B4B		
							Packaging 2 - 14 - B4B		
							Packaging 2 - 15 - B4B		
							Packaging 2 - 16 - B4B		
							Packaging 2 - 17 - B4B		
							Packaging 2 - 18 - B4B		
							Packaging 2 - 19 - B4B		
							Packaging 2 - 20 -		



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Container No: S204600



Part: P7300-50

Job No: 197799

Serial No/Batch: S204600

Revision: 1

Inspector:

Exp Date:

Date: 08/12/19

Plex 7/16/19 3:20 PM Dart.Lavoie.Chanta

						B4B	
						Packaging 2 - 21 - B4B	
						Packaging 2 - 22 - B4B	
						Packaging 2 - 23 - B4B	
						Packaging 2 - 24 - B4B	
						Packaging 2 - 25 - B4B	
						Packaging 2 - 26 - B4B	
						Packaging 2 - 27 - B4B	
						Packaging 2 - 28 - B4B	
						Packaging 2 - 29 - B4B	
						Packaging 2 - 30 - B4B	
						Packaging 2 - 31 - B4B	
						Packaging 2 - 32 - B4B	
						Packaging 2 - 33 - B4B	
						Packaging 2 - 34 - B4B	
						Packaging 2 - 35 - B4B	
						Packaging 2 - 36 - B4B	
130 QC 6	10 pcs	8/12/19	0.00	0.00		QC 6 - 9	
						QC 6 - 68	
						QC 6 - 61	DAS 61 9-89
						QC 6 - 40	
						QC 6 - 81	
131 Small Fab - 2 - B4B	10 pcs	8/12/19	0.00	10.00		Small Fab - 1 - B4B	
						Small Fab - 2 - B4B	
						Small Fab - 3 - B4B	
						Small Fab - 4 - B4B	
						Small Fab - 5 - B4B	
						Small Fab - 6 - B4B	
						Small Fab - 7 - B4B	
132 QC 5	10 pcs	8/12/19	0.00	0.00		QC 5 - 10	
						QC 5 - 12	
						QC 5 - 17	
						QC 5 - 18	
						QC 5 - 19	
						QC 5 - 22	
						QC 5 - 24	DAS 19 9-89
						QC 5 - 3	
						QC 5 - 43	
						QC 5 - 49	
						QC 5 - 51	
						QC 5 - 58	
						QC 5 - 68	
						QC 5 - 9	
						QC 5 - 50	
						QC 5 - 30	
						QC 5 - 40	

				QC 5 - 61		
				QC 5 - 81		
140	Packaging 3-1 - Stock - B4B	10	8/12/19	0.00	0.00	Packaging 3 - 1 - B4B
	pcs					Packaging 3 - 2 - B4B
						Packaging 3 - 3 - B4B
						Packaging 3 - 4 - B4B
						Packaging 3 - 5 - B4B
						Packaging 3 - 6 - B4B
						Packaging 3 - 7 - B4B
						Packaging 3 - 8 - B4B
						Packaging 3 - 9 - B4B
						Packaging 3 - 10 - B4B
						Packaging 3 - 11 - B4B
						Packaging 3 - 12 - B4B
						Packaging 3 - 13 - B4B
						Packaging 3 - 14 - B4B
						Packaging 3 - 15 - B4B
						Packaging 3 - 16 - B4B
						Packaging 3 - 17 - B4B
						Packaging 3 - 18 - B4B
						Packaging 3 - 19 - B4B
						Packaging 3 - 20 - B4B
						Packaging 3 - 21 - B4B
						Packaging 3 - 22 - B4B
						Packaging 3 - 23 - B4B
						Packaging 3 - 24 - B4B
						Packaging 3 - 25 - B4B
						Packaging 3 - 26 - B4B
						Packaging 3 - 27 - B4B
						Packaging 3 - 28 - B4B
						Packaging 3 - 29 - B4B
						Packaging 3 - 30 - B4B
						Packaging 3 - 31 - B4B
						Packaging 3 - 32 - B4B
						Packaging 3 - 33 - B4B
						Packaging 3 - 34 - B4B
						Packaging 3 - 35 - B4B
						Packaging 3 - 36 -

DAG
19
2-28

145 DC - 1 - B4B	10 pcs	8/12/19	0.00	0.00	B4B	DC - 1 - B4B	
						DC - 2 - B4B	AUG 20 2019
150 QC 21 - FG	10 pcs	8/12/19	0.00	0.00		QC 21 - FG - 21	
						QC 21 - FG - 70	
						QC 21 - SA - 53	AUG 20 2019

Part Op 110 - (Purchasing) - Issue P/O to Tulmar; P/O _____ - Manufacture P7300-50 AS PER DWG C OF C IS
 Descriptions: REQUIRED

120 - (Receive & Inspect for Damage & Mat'l Certs)

130 - (QC6- All purchased or subcontracted products)

131 - 1-Pick DALL long line. 2-Engrave 1632T22 tags as per DWG sheet 2. 3-ASSEMBLED LANYARD LENGTH MUST BE 5" +/- 1". LANYARD MUST BE INSTALLED WITH ID TAG TO THE BASE OF THE THIMBLE AND PASS THROUGH THE ROPE STRANDS IN ORDER TO BE SECURED. BLUE JACKET (IF APPLICABLE) VELCRO NEED TO BE FASTENED OVER ASSEMBLED LANYARD AND ID TAG. THE ID TAG MUST NOT MOVE FREELY ONCE INSTALLED. 5-Attach tag using 90177A218 ring to zipper on -21 bag, place second tag in front pocket of -21 bag as per drawing sheet 2. 6-MACHINE ENGRAVE, OR DOT MARK, OR STAMP USING 0.25" STAMP, S/N ONTO EACH THIMBLE 7-COIL LONG LINE INTO BAG

132 - (QC5- Inspect part completeness to step on W/O)

140 - (Identify as per dwg & Stock Location: _____)

145 - Photocopy blue file OM-SLP Long line Rev 11

150 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
P7300-50P	Plasma® Long Line 7,300 lbs Safe Work Load (3,300 kg)	10 pcs (1 ea)	110-Purchasing	5204599
1632T22	Aluminum Tag 1" X 2" X 0.04"	40 pcs (4 ea)	131-Small Fab - 2 - B4B	5191371
3896T31	Ferule 1/16 X 3/8" - Aluminum	40 Ea (4 ea)	131-Small Fab - 2 - B4B	5137360
6820A12	Clear Heat Shrink Tape 3/4" Wide	2,0800 ft (.208 ea)	131-Small Fab - 2 - B4B	5109175
90905A673	Split Ring, Ø1-1/16 OD x Ø15/16 ID x 1/8	20 Ea (2 ea)	131-Small Fab - 2 - B4B	5199934
CL-2-C	Lanyard Wire	10 ft (1 ea)	131-Small Fab - 2 - B4B	5190004
DALL-###-21 Dart Aerospace Bag		10 pcs (1 ea)	131-Small Fab - 2 - B4B	5186163

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
110-Purchasing	P7300-50P	10	1	0
131-Small Fab - 2 - B4B	1632T22	40	52	0
	3896T31	40	439	0
	6820A12	2	300	0
	90905A673	20	16	0
	CL-2-C	10	1,210	0
	DALL-###-21	10	33	0

DALL-H-E-B-#-5	X20PCS	5198011	OPHO 110
P7300P	Part Specifications	OPHO 110	520552
5029552			5199324
5199324			

Specifications could not be found.

Plex 7/16/19 3:20 PM Dart.Lavoie.Chantal

DAS
63
3-8

5198011

011505

P3000-150

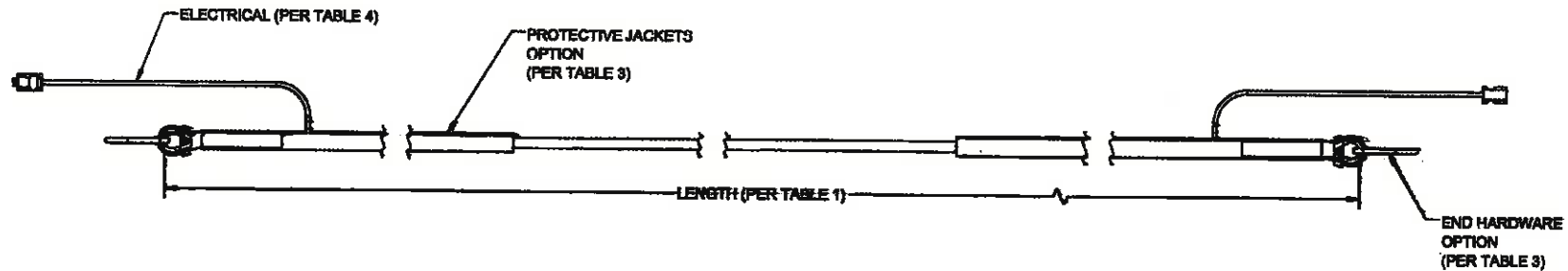


TABLE 1 LENGTH	
DART LONG LINE PART NUMBER CODE	DESCRIPTION
50 DALL-#-#-#	REPLACE FIRST # WITH LONG LINE TOTAL LENGTH IN FEET (MAX 200)

TABLE 3 OPTIONS	
DART LONG LINE PART NUMBER CODE	OPTION DESCRIPTION
DALL-#-#-#	WITH PEAR SHAPED LIFTING RING END AND PROTECTIVE JACKETS
DALL-#-#-#	WITHOUT PEAR SHAPED LIFTING RING END AND PROTECTIVE JACKETS
DALL-#-#-#-F	WITH PEAR SHAPED LIFTING RING END, WITHOUT PROTECTIVE JACKETS AND WITHOUT ELECTRICAL WIRE
DALL-#-#-#-F	WITHOUT PEAR SHAPED LIFTING RING END, WITHOUT PROTECTIVE JACKETS AND WITHOUT ELECTRICAL WIRE

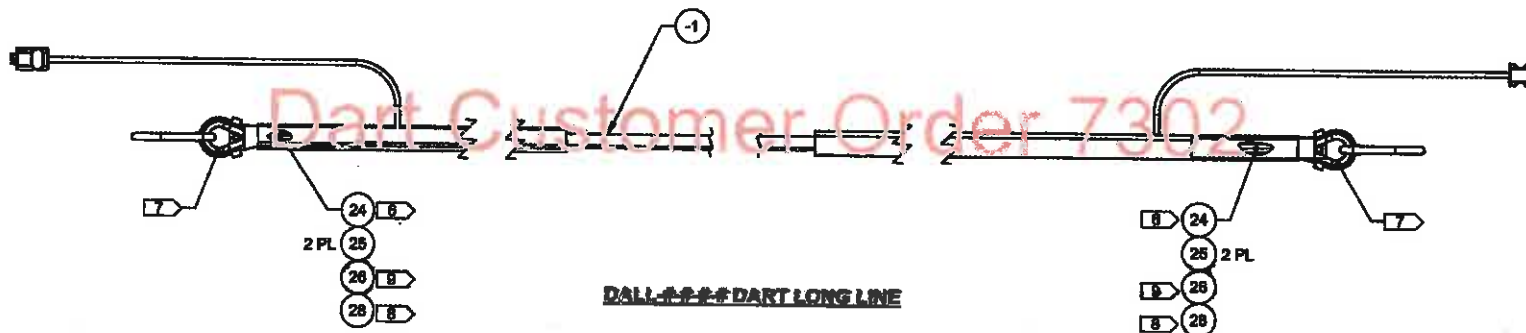
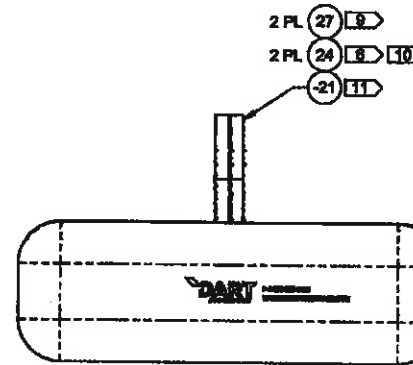
TABLE 2 CAPACITY	
DART LONG LINE PART NUMBER CODE	CAPACITY (LBS)
DALL-#-#-#	2500
DALL-#-#-#	3000
DALL-#-#-#	4400
DALL-#-#-#	5400
DALL-#-#-#	7300
DALL-#-#-#	9700
DALL-#-#-#	13 200

TABLE 4 ELECTRICAL	
DART LONG LINE PART NUMBER CODE	ELECTRICAL WIRE DESCRIPTION
DALL-#-#-#-A	3 CONDUCTOR 14 GA
DALL-#-#-#-B	3 CONDUCTOR 12 GA
DALL-#-#-#-C	4 CONDUCTOR 14 GA
DALL-#-#-#-D	6 CONDUCTOR 16 GA
DALL-#-#-#-E	8 CONDUCTOR 16 GA
DALL-#-#-#-F	NO ELECTRICAL
DALL-#-#-#-G	2 CONDUCTOR 14 GA
DALL-#-#-#-H	2 CONDUCTOR 12 GA

MANUFACTURE PER
DALL-60-E-B-A STEPS
USING PLASMA 12 STRAND ROPE

D -1 ADDED DALL-#-#-#-G, DALL-#-#-#-H, DALL-#-#-#-F AND DALL-#-#-#-F. ADDED ITEMS -22, -23, -24, -25 & -26. UPDATED NOTE 8. ADDED NOTES 7, 8 & 9. UPDATED TABLE 3 (OPTIONS) AND TABLE 4 (ELECTRICAL) -11 UPDATED NOTES 8 & 9. ADDED NOTE 11. REMOVED WHITE FABRIC LABEL NOTE -13 UPDATED TABLE 7 (ROPE MATERIAL) -15 REMOVED DIM. 1.0. ADDED DIM 8. UPDATED TABLE 8 (THIMBLE ASSEMBLY AND END HARDWARE) -16 REMOVED DIM 0.8. ADDED DIM FOR LENGTH. UPDATED TABLE 9 (RETAINER) -17 REMOVED DIM. 1.36 POCKET WIRE -18 UPDATED TABLE 10 (ORANGE JACKET) -14 ADDED DIM 2.4 REF -19 MATERIAL IS WEBBING NYLON BLACK, MIL-W-17337F, CL1, 1-1/2" WIDE WEBBING NYLON BLACK, MIL-W-17337F, CL1, 1-1/2", NO FR TREAT -20 UPDATED TABLE 11 (ELECTRICAL WIRE)		19-770	ML
C TULMAR COMMENTS INCORPORATED		18-778	ML
B TULMAR COMMENTS INCORPORATED, THIMBLE MATERIAL IS NOW STAINLESS, ELECTRICAL WIRE TABLE UPDATED, 15 700 LB LONGLINE REMOVED		18-770	VM
A NEW ISSUE		18-585	VM
REV.	DESCRIPTION	ECN #	BY
DESIGN DRAWN CHECKED MFG. APPR. APPROVED DATE	MBB MBB KPT DP [Signature] 2019-05-09	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA TYPED BY: P7300-50 REV. D SHEET 1 OF 25 TITLE DART LONG LINE SCALE NTS [Symbol]	

ITEM #	QTY	PART #	PART TITLE
-1	1	DALL-###-#1	DART LONG LINE
-21	1	DALL-###-#21	DART AEROSPACE BAG
24	4	McMaster#1632T22 OR EQUIV.	ID TAG
25	4	McMaster#3890T31 OR EQUIV.	ALUMINUM WIRE ROPE COMPRESSION SLEEVE 1/16" DIA. X 3/8" LG.
26	A/R	McMaster#8820A12 OR EQUIV.	CLEAR HEAT-SHRINK TAPE 3/4" WD.
27	2	McMaster#908059573 OR EQUIV.	85 SPLIT RING 15/16" ID. X 1-1/16" OD. X 1/8" THK.
28	A/R	CARR LANE#CL-2-C	NYLON COATED STEEL LANYARD 1/16" DIA



NOTES:

- 1) MATERIAL: N/A
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES:

$X2 = \pm 1"$
 $X.X2 = \pm 0.5"$
 $X.XX2 = \pm 0.25"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

- 6) IDENTIFICATION: DOT MARK THE FOLLOWING INFO ONTO ITEM 24:

P/N:

LENGTH: XXX FT (REFER TO TABLE 1)

CAPACITY: XX XXX LBS (REFER TO TABLE 2)

S/N: XXXXXX (REFER TO S/N ENGRAVED ON THIMBLES)

EIS DATE: MM/DD/YYYY (EIS DATE IS THE SHIPPING DATE)

- 7) IDENTIFICATION: MACHINE ENGRAVE, OR DOT MARK, OR STAMP USING 0.25" STAMP, S/N ONTO EACH THIMBLE

- 8) ASSEMBLED LANYARD LENGTH MUST BE 5" $\pm$ 1". LANYARD MUST BE INSTALLED WITH ID TAG TO THE BASE OF THE THIMBLE AND PASS THROUGH THE ROPE STRANDS IN ORDER TO BE SECURED. BLUE JACKET (IF APPLICABLE) VELCRO NEED TO BE FASTENED OVER ASSEMBLED LANYARD AND ID TAG. THE ID TAG MUST NOT MOVE FREELY ONCE INSTALLED.

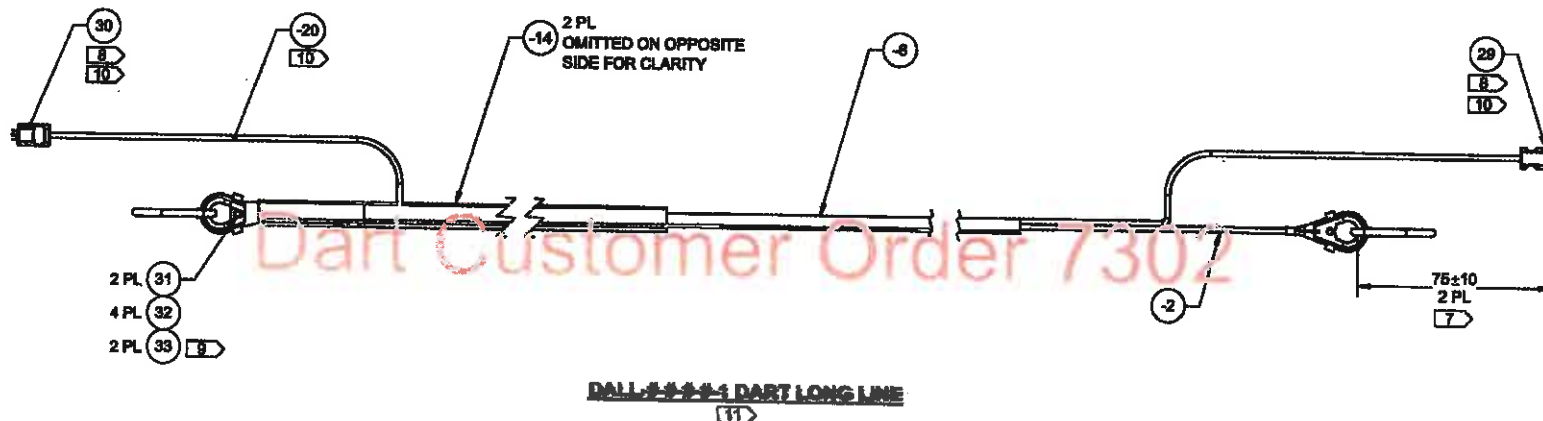
- 9) COVER ID TAG AND SLEEVES USING ITEM 26 TO PREVENT DAMAGE TO THE ROPE

- 10) ATTACH ONE ID TAG TO THE BAG ZIPPER WITH THE SPLIT RING AND PLACE ONE ID TAG AND SPLIT RING INTO THE BAG SIDE POCKET

- 11) COIL LONG LINE INTO BAG

DESIGN	MSB	DART AEROSPACE LTD	
DRAWN	MSB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	P7300-50	SHEET 2 OF 25
APPROVED	<i>MSB</i>	TITLE	SCALE
DATE	2019-05-09	DART LONG LINE	NTS
COPYRIGHT © 2019 BY DART AEROSPACE LTD THIS DRAWING IS PRIVATE, UNCLASSIFIED, AND IS SUPPLIED ON THE UNDERSTANDING THAT IT IS NOT TO BE LOANED, REPRODUCED, COPIED, OR OTHERWISE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD.			

ITEM #	QTY	PART #	PART TITLE
-2	1	DALL-#-#-#-2	ROPE ASSY
-8	1	DALL-#-#-#-8	ORANGE JACKET ASSY
-14	2	DALL-#-#-#-14	BLUE JACKET ASSY
-20	A/R	DALL-#-#-#-20	ELECTRICAL WIRE
29	1	PASS & SEYMOUR #PS5985Y or McMaster#7216K6	3 PRONG FEMALE SPADE PLUG
30	1	PASS & SEYMOUR #PS5985Y or McMaster#7216K6	3 PRONG MALE SPADE PLUG
31	2	ANSC10A	BOLT
32	4	NAS1146C0388R	FLAT WASHER
33	2	MS21044CS	HEX NUT



NOTES:

- 1) MATERIAL: N/A
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1"$

X.XX = $\pm 0.01"$ / $\pm 0.5"$
X.XXX = $\pm 0.005"$ / $\pm 0.1"$
X.XXXX = $\pm 0.0005"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES UNLESS OTHERWISE NOTED
- 6) IDENTIFICATION: N/A
- 7) CUT ELECTRICAL WIRE TO LENGTH AS SHOWN

- 8) INSTALL ITEMS 29 AND 30 USING INDUSTRY STANDARD TECHNIQUES. ATTACH GREEN WIRE (IF APPLICABLE) TO THE GROUND PIN, ATTACH WHITE WIRE TO THE NARROW BLADE TERMINAL, ATTACH THE BLACK WIRE TO THE WIDE BLADE TERMINAL.
- 9) ONLY INCLUDE ITEMS 29 AND 30 WITH DALL-#-#-#-A, DALL-#-#-#-B, DALL-#-#-#-G AND DALL-#-#-#-H
- 10) TIGHTEN NUT UNTIL IT CONTACTS FABRIC (IT IS ACCEPTABLE TO USE A LONGER OR SHORTER BOLT, 1-4 BOLT THREADS MUST BE EXPOSED)

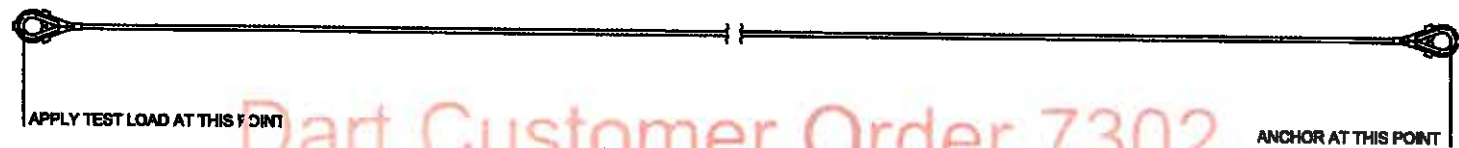
- 11) ELECTRICAL CABLE MUST BE FREE OF DAMAGE OR NICKS TO THE INSULATION. ELECTRICAL CONNECTORS MUST BE SECURELY INSTALLED. PERFORM CONTINUITY CHECK TO ENSURE THERE IS NO SHORT AND, IF APPLICABLE THAT CABLES ARE CONNECTED PROPERLY
- 12) ITEMS -8, -14, -20, AND 29 TO 33 NOT INCLUDED FOR DALL-#-#-#-C-F AND DALL-#-#-#-D-F

PER SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAMPSHIRE, ONTARIO, CANADA	
CHECKED	KPT	TITLE	REV. D
MFG. APPR.	DP	DART LONG LINE	SHEET 3 OF 26
APPROVED	MBB	SCALE	NTS
DATE	2019-05-09	COPYRIGHT © 2019 BY DART AEROSPACE LTD	



DALL-#A-#2 ROPE ASSY
DART LONGLINE ASSEMBLY WITH PEAR SHAPED LIFTING RING OPTION



DALL-#B-#2 ROPE ASSY
DART LONGLINE ASSEMBLY WITHOUT PEAR SHAPED LIFTING RING OPTION

TABLE 5 ROPE LOAD TEST	
DART LONG LINE PART NUMBER CODE	TEST LOAD (LBS)
DALL-#A-##	7500
DALL-#B-##	9000
DALL-#C-##	18 200
DALL-#D-##	18 200
DALL-#E-##	21 900
DALL-#F-##	29 100
DALL-#G-##	39 800

NOTES:

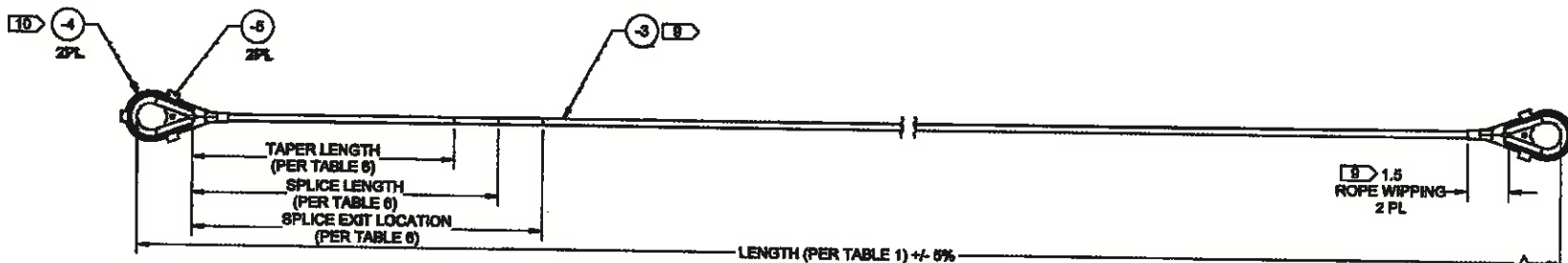
- 1) MATERIAL: N/A
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1"$
 XXX = $\pm 0.01"$ / $\pm 0.5"$
 XXXX = $\pm 0.005"$ / $\pm 0.1"$
 XXXXX = $\pm 0.0005"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES UNLESS OTHERWISE NOTED
- 6) IDENTIFICATION: N/A
- 7) THE DALL-#A-#2 MUST BE LOAD TESTED TO 3X THE WORKING LOAD (PER TABLE 5) FOR 5 CONTINUOUS MINUTES. INSPECT ROPE AFTER LOAD TEST TO ENSURE THERE ARE NO BROKEN OR DAMAGED STRANDS. FRAYING AND DAMAGE TO THE ROPE IS NOT ACCEPTABLE. INSPECT THIMBLE TO ENSURE THERE IS NO DISTORTION OR DAMAGED WELDS
- 8) CARE MUST BE TAKEN TO PREVENT DAMAGE DURING TESTING
- 9) TEST LOADS MUST BE DOCUMENTED

DESIGN	MBB	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	MBB	TOOL PART #	REV. D
CHECKED	KPT	P7300-50	SHEET 4 OF 25
MFG. APPR.	DP	TITLE	SCALE
APPROVED	<i>[Signature]</i>	DART LONG LINE	NTS
DATE 2019-05-09		COPYRIGHT © 2019 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD.	

ITEM #	QTY	PART #	PART TITLE
-3	1	DALL-#-#-#-3	ROPE
-4	2	DALL-#-#-#-4	FABRIC WEARPAD
-5	2	DALL-#-#-#-5	THIMBLE ASSY



DALL-#-#-#-2 ROPE ASSY
(SHOWN ASSEMBLED)

TABLE 6
FABRICATION MEASUREMENTS

DART LONG LINE PART NUMBER	SPLICE LENGTH (INCHES)	TAPER LENGTH (INCHES)	SPLICE EXIT LOCATION (INCHES)	THIMBLE CIRCUMFERENCE (INCHES)
DALL-#-#-#-3	25	8	30	9
DALL-#-#-#-4	30	10	35	10
DALL-#-#-#-5	35	10	40	10
DALL-#-#-#-6	40	13	50	10
DALL-#-#-#-7	45	13	55	14
DALL-#-#-#-8	50	18	65	14
DALL-#-#-#-9	60	20	75	17

NOTES:

- 1) MATERIAL: N/A
2) HEAT TREAT: N/A
3) FINISH: N/A

4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1"$

XJXX = $\pm 0.01"$ / $\pm 0.5"$

XJXX = $\pm 0.005"$ / $\pm 0.1"$

XJXXX = $\pm 0.0005"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

5) UNITS: INCHES UNLESS OTHERWISE NOTED

6) REMOVE ALL SHARP EDGES

7) IDENTIFICATION: N/A

8) ROPE CUT LENGTH FORMULA = (SPLICE LENGTH PER TABLE 6 + 3" + THIMBLE CIRCUMFERENCE PER TABLE 6) + (REQUIRED TOTAL LENGTH - 1%).

9) PREPARE THE ROPE SPLICE AS FOLLOWS:

- MEASURING FROM THE END OF THE ROPE, MARK THE SPLICE LENGTH, TAPER LENGTH AND EXIT LOCATION PER TABLE 6
- PASS THE ROPE THROUGH THE THIMBLE AND FABRIC WEARPAD UNTIL THE SPLICE LENGTH MARK IS 1.5" FROM THE BASE OF THE THIMBLE
- MAKE A MARK 1.5" FROM THE BASE OF THE THIMBLE ON THE OTHER SIDE OF THE ROPE (BESIDE THE FIRST SPLICE LENGTH MARK)
- PLACE THE END OF THE ROPE IN THE SPLICING FID
- AT THE LOCATION MARKED AT STEP "C", CAREFULLY INSERT THE SPLICING FID IN THE CENTER OF THE ROPE
- WORK THE SPLICING FID ALONG THE HOLLOW CENTER OF THE ROPE AND EXIT AT THE SPLICE EXIT LOCATION MARK MADE EARLIER
- REMOVE THE SPLICING FID
- MARK EVERY FOURTH "S" / "Z" STRAND STARTING AT THE TAPER MARK, CUT AND REMOVE THE MARKED STRANDS
- MARK AND THEN CUT THE NEXT THREE CONSECUTIVE STRANDS NEAR THE END OF THE ROPE
- CUT THE TIP OF THE REMAINING STRANDS AT AN ANGLE
- CAREFULLY SMOOTH THE ROPE AWAY FROM THE THIMBLE (THE TAPER WILL NOW BE INSIDE OF THE ROPE)
- ENSURE THE MARKS CLOSEST TO THE THIMBLE ARE ALIGNED (APPROXIMATELY 1.5" FROM THE BASE OF THE THIMBLE)
- ONCE THE ROPE SPLICE IS COMPLETE THE ROPE MUST BE TIGHTLY "WHIPPED" AT APPROXIMATELY 1.5" FROM THE BASE OF THE THIMBLE USING 5-10 WRAPS OF 1/16" CORD
- REPEAT THE STEPS ABOVE ON THE OPPOSITE SIDE OF THE LONGLINE
- THE -4 FABRIC WEARPAD MUST BE MANUFACTURED FROM ABRASION RESISTANT NYLON OR ARAMID FABRIC. THE WEARPAD MUST TIGHTLY FIT AROUND THE ROPE AND EXTEND 1.0" BELOW THE BASE OF THE THIMBLE

PER SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	P73000-50	SHEET 5 OF 25
APPROVED		TITLE	SCALE
		DART LONG LINE	NTS
DATE	2019-05-09	COPYRIGHT © 2019 BY DART AEROSPACE LTD	

ASSEMBLY INFO								
DART LONG LINE PART NUMBER CODE	THIMBLE ASSY PART NUMBER	DESCRIPTION	RETAINER PART NUMBER	GUSSET PART NUMBER	PURCHASE THIMBLE PART NUMBER (McMASTER CARR)	PURCHASE LIFTING RING PART NUMBER (McMASTER CARR)	DIMENSION A ±0.05"	DIMENSION B ±0.13"
DALL-#A-#5 DALL-#A-CF	DALL-#A-A-#5	THIMBLE WITH 1/2" PEAR RING	DALL-#A-A-#6	DALL-#A-#23	(9/16") 3485T41 OR EQUIVALENT	3570T34 OR EQUIVALENT	2.00	1.10
DALL-#B-A-#5 DALL-#B-CF	DALL-#B-A-#5	THIMBLE WITH 1/2" PEAR RING	DALL-#B-A-#6	DALL-#B-#23	(9/16") 3485T41 OR EQUIVALENT	3570T34 OR EQUIVALENT	2.00	1.10
DALL-#C-A-#5 DALL-#C-CF	DALL-#C-A-#5	THIMBLE WITH 3/4" PEAR RING	DALL-#C-A-#6	DALL-#C-#23	(5/8") 3485T51 OR EQUIVALENT	3570T35 OR EQUIVALENT	2.80	1.20
DALL-#D-A-#5 DALL-#D-CF	DALL-#D-A-#5	THIMBLE WITH 3/4" PEAR RING	DALL-#D-A-#6	DALL-#D-#23	(5/8") 3485T51 OR EQUIVALENT	3570T35 OR EQUIVALENT	2.80	1.20
DALL-#E-A-#5 DALL-#E-CF	DALL-#E-A-#5	THIMBLE WITH 3/4" PEAR RING	DALL-#E-A-#6	DALL-#E-#23	(3/4") 3485T49 OR EQUIVALENT	3570T35 OR EQUIVALENT	3.00	1.30
DALL-#F-A-#5 DALL-#F-CF	DALL-#F-A-#5	THIMBLE WITH 3/4" PEAR RING	DALL-#F-A-#6	DALL-#F-#23	(7/8") 3485T42 OR EQUIVALENT	3570T35 OR EQUIVALENT	3.40	1.40
DALL-#G-A-#5 DALL-#G-CF	DALL-#G-A-#5	THIMBLE WITH 3/4" PEAR RING	DALL-#G-A-#6	DALL-#G-#22	(1") 3485T43 OR EQUIVALENT	3570T35 OR EQUIVALENT	3.50	1.50
DALL-#A-B-#5 DALL-#A-DT	DALL-#A-B-#5	THIMBLE ONLY	DALL-#A-A-#6	DALL-#A-#27	(9/16") 3485T41 OR EQUIVALENT	N/A	2.00	1.10
DALL-#B-B-#5 DALL-#B-DT	DALL-#B-B-#5	THIMBLE ONLY	DALL-#B-A-#6	DALL-#B-#27	(9/16") 3485T41 OR EQUIVALENT	N/A	2.00	1.10
DALL-#C-B-#5 DALL-#C-DT	DALL-#C-B-#5	THIMBLE ONLY	DALL-#C-A-#6	DALL-#C-#27	(5/8") 3485T51 OR EQUIVALENT	N/A	2.80	1.20
DALL-#D-B-#5 DALL-#D-DT	DALL-#D-B-#5	THIMBLE ONLY	DALL-#D-A-#6	DALL-#D-#27	(5/8") 3485T51 OR EQUIVALENT	N/A	2.80	1.20
DALL-#E-B-#5 DALL-#E-DT	DALL-#E-B-#5	THIMBLE ONLY	DALL-#E-A-#6	DALL-#E-#23	(3/4") 3485T49 OR EQUIVALENT	N/A	3.00	1.30
DALL-#F-B-#5 DALL-#F-DT	DALL-#F-B-#5	THIMBLE ONLY	DALL-#F-A-#6	DALL-#F-#23	(7/8") 3485T42 OR EQUIVALENT	N/A	3.40	1.40
DALL-#G-B-#5 DALL-#G-DT	DALL-#G-B-#5	THIMBLE ONLY	DALL-#G-A-#6	DALL-#G-#22	(1") 3485T43 OR EQUIVALENT	N/A	3.50	1.50

NOTES:

- 1) MATERIAL: N/A
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES

$$X.X = 0.06 / \pm 0.10$$

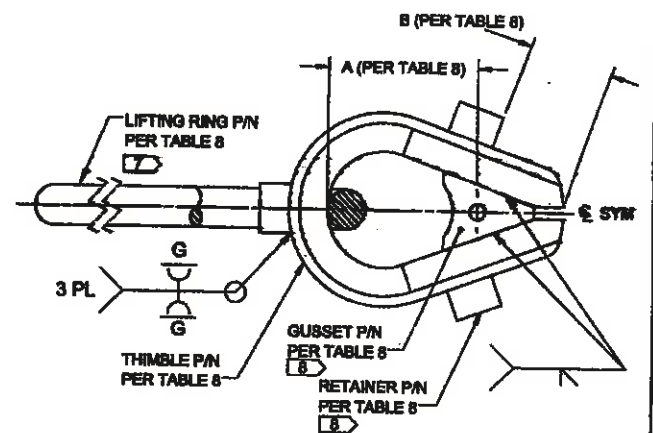
$$X.XX = 0.01 / \pm 0.05$$

$$X.XXX = 0.005 / \pm 0.1$$

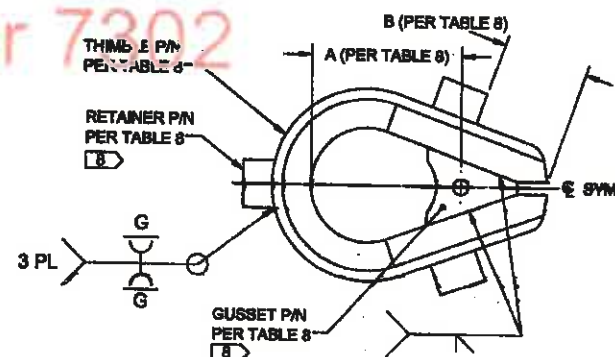
UNLESS OTHERWISE NOTED

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = ±0.005"

- 5) UNITS: INCHES UNLESS OTHERWISE NOTED
- 6) REMOVE ALL SHARP EDGES, BURRS, AND WELD SPATTERS
- 7) SPREAD THE THIMBLE APART AS NECESSARY AT THE OPENING IN ORDER TO INSTALL THE LIFTING RING, BEND BACK INTO POSITION ONCE THE LIFTING RING IS INSTALLED
- 8) TRIM/GRIND THE DALL-#A-#6 RETAINER AND THE DALL-#A-#7 OR DALL-#A-#22 OR DALL-#A-#23 GUSSET TO MATCH THIMBLE PROFILE
- 9) IT IS ACCEPTABLE TO BEND THE THIMBLE IN / OUT TO PERMIT INSTALLATION OF THE DALL-#A-#7 OR DALL-#A-#22 OR DALL-#A-#23 GUSSET
- 10) IT IS ACCEPTABLE TO BEND THE RETAINER IN / OUT TO PERMIT TO MATCH THIMBLE PROFILE

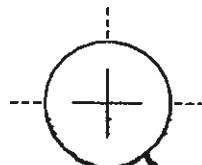


DALL-#A-#5 THIMBLE ASSY
DART LONGLINE ASSEMBLY WITH PEAR SHAPED LIFTING RING OPTION
9 10

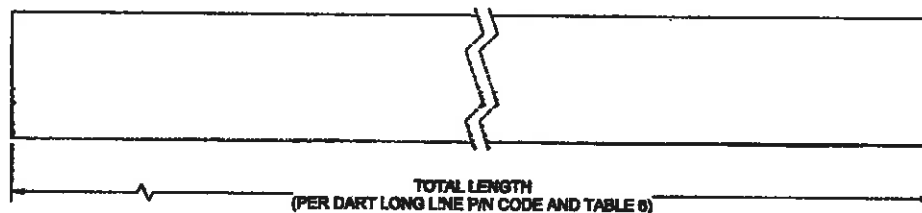


DALL-#B-#5 THIMBLE ASSY
DART LONGLINE ASSEMBLY WITHOUT PEAR SHAPED LIFTING RING OPTION
9 10

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART 8	REV. D
MFG. APPR.	DP	P7300-50	SHEET 7 OF 25
APPROVED	MBB	TITLE	SCALE
		DART LONG LINE	NTS
DATE	2019-05-09	COPYRIGHT © 2019 BY DART AEROSPACE LTD	



ROPE Ø
(SEE TABLE 7)



TOTAL LENGTH
(PER DART LONG LINE PIN CODE AND TABLE 6)

**TABLE 7
ROPE MATERIAL**

DART LONG LINE PART NUMBER CODE	MATERIAL PART NUMBER	DESCRIPTION
DALL-#A-#	SUPREEMX-12™ DYNEEMA® X Ø 3/8"	Ø 3/8" 12 STRAND ROPE, 17 550 LBS MIN TENSILE STRENGTH
DALL-#B-#	SUPREEMX-12™ DYNEEMA® X Ø 7/16"	Ø 7/16" 12 STRAND ROPE, 24 450 LBS MIN TENSILE STRENGTH
DALL-#C-#	SUPREEMX-12™ DYNEEMA® X Ø 1/2"	Ø 1/2" 12 STRAND ROPE, 30 000 LBS MIN TENSILE STRENGTH
DALL-#D-#	SUPREEMX-12™ DYNEEMA® X Ø 9/16"	Ø 9/16" 12 STRAND ROPE, 37 080 LBS MIN TENSILE STRENGTH
DALL-#E-#	PLASMA 12 STRAND Ø 5/8"	Ø 5/8" 12 STRAND ROPE 51 500 LBS MIN TENSILE STRENGTH
DALL-#F-#	SUPREEMX-12™ DYNEEMA® X Ø 3/4"	Ø 3/4" 12 STRAND ROPE, 50 400 LBS MIN TENSILE STRENGTH
DALL-#G-#	SUPREEMX-12™ DYNEEMA® X Ø 7/8"	Ø 7/8" 12 STRAND ROPE, 85 500 LBS MIN TENSILE STRENGTH

DALL-#E-# ROPE

17

NOTES:

- 1) MATERIAL: REFER TO TABLE 7
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A

4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1^\circ$
 X.XX = $\pm 0.01"$ / $\pm 0.5^\circ$
 X.XXX = $\pm 0.005"$ / $\pm 0.1^\circ$
 X.XXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$

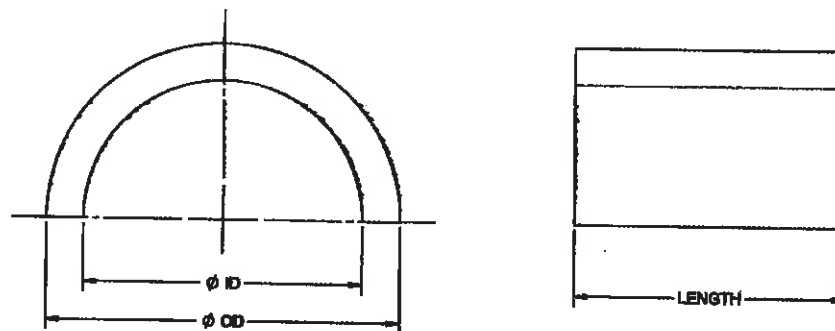
PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

5) UNITS: INCHES UNLESS OTHERWISE NOTED

6) IDENTIFICATION: N/A

7) NO ROPE COLOR REQUIREMENTS

DESIGN	MSB	DART AEROSPACE LTD	
DRAWN	MSB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TITLE	REV. D
MFG. APPR.	DP	PT300-50	SHEET 6 OF 26
APPROVED	<i>[Signature]</i>	TITLE	SCALE
		DART LONG LINE	NTS
DATE	2019-05-09	COPYRIGHT © 2019 BY DART AEROSPACE LTD	



**TABLE 9
RETAINER**

RETAINER PART NUMBER	Ø ID IN	Ø OD IN	LENGTH IN	(OPTIONAL) FINISHES: KAY MATTERIAL (ICMAS) ER CORR RES
DALL-8-A-A-#8	0.82	0.84	0.83	44835K251
DALL-8-C-A-#8	0.82	1.06	0.83	44835K261
DALL-8-B-A-#8	0.86	1.33	0.75	4804T151
DALL-8-F-A-#8	1.26	1.50	1.00	88485K265

DALL-8-A-A-#8 RETAINER

8 9

NOTES:

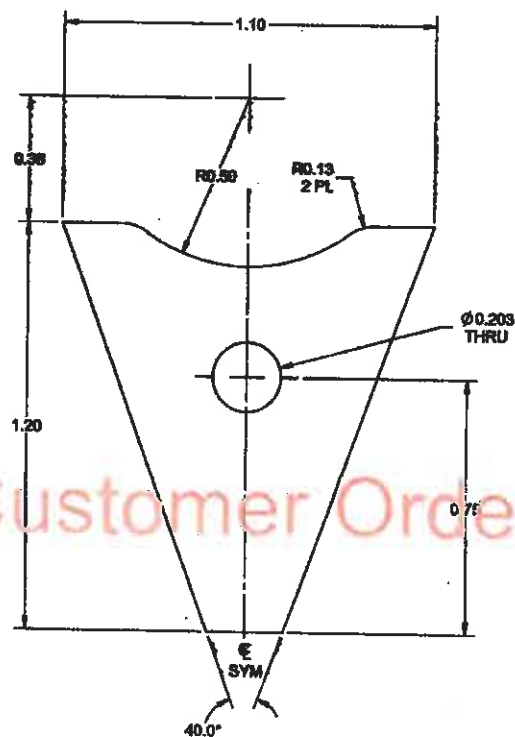
- 1) MATERIAL: 18-8 / 304 / 316 STAINLESS STEEL, REFER TO TABLE 9 AND NOTE 9
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1"$
 XXX = $\pm 0.01"$ / $\pm 0.5"$
 XXXX = $\pm 0.005"$ / $\pm 0.1"$
 XXXXX = $\pm 0.0005"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) REMOVE ALL SHARP EDGES AND BURRS
- 7) IDENTIFICATION: N/A
- 8) RETAINER IS TRIMMED TO FIT AT ASSY
- 9) THE RETAINER MUST BE MANUFACTURED FROM STAINLESS STEEL PIPE THAT HAS THE SAME OD AND ID AS THE THIMBLE BEING ASSEMBLED

PER SHEET 7 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	PT300-50	SHEET 8 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
		DART LONG LINE	NTS
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Dart Customer Order 7302

DALL # 1-1-7 GUSSET

NOTES:

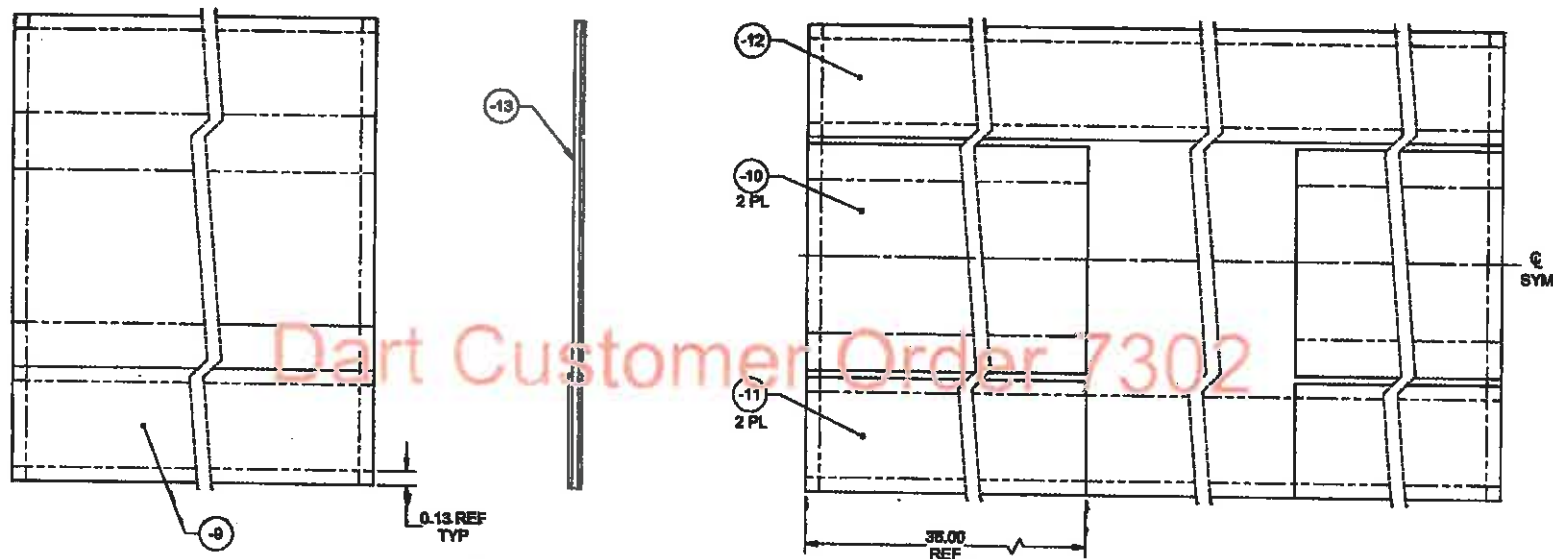
- 1) MATERIAL: 304 / 316 STAINLESS STEEL
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1"$
X.XX = $\pm 0.01"$ / $\pm 0.5"$
X.XXX = $\pm 0.008"$ / $\pm 0.1"$
X.XXXX = $\pm 0.0008"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) REMOVE ALL SHARP EDGES AND BURRS
- 7) IDENTIFICATION: N/A

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	PT300-50	SHEET 8 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
		DART LONG LINE	NTS
DATE	2019-05-09	COPYRIGHT © 2019 BY DART AEROSPACE LTD	

ITEM #	QTY	PART #	PART TITLE
-9	1	DALL-#-#-#-9	FASTENER LOOP
-10	2	DALL-#-#-#-10	FASTENER HOOK
-11	2	DALL-#-#-#-11	FASTENER HOOK
-12	1	DALL-#-#-#-12	FASTENER HOOK
-13	1	DALL-#-#-#-13	ORANGE JACKET



DALL-#-#-#-9 ORANGE JACKET ASSY

8 9 10

NOTES:

- 1) MATERIAL: N/A
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1"$

X.XX = $\pm 0.01"$ / $\pm 0.5"$
X.XXX = $\pm 0.005"$ / $\pm 0.1"$
X.XXXX = $\pm 0.0005"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

6) IDENTIFICATION: N/A

7) SEW ITEMS TOGETHER AS SHOWN

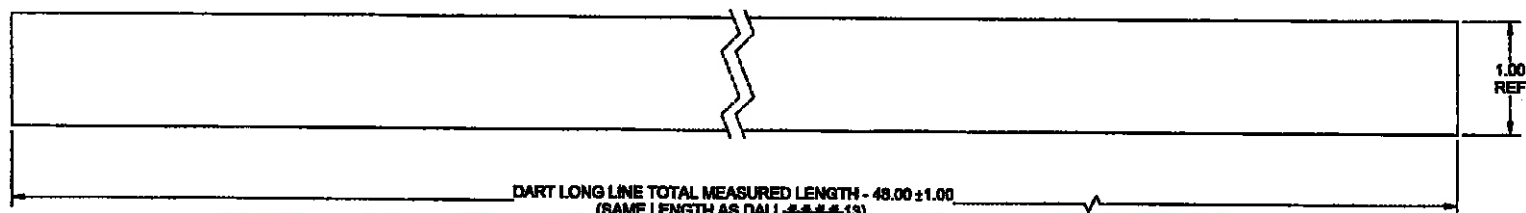
8) STITCHING TO BE IAW ASTM D6183, TYPE 301, 8-10 STITCHES PER INCH, MINIMUM 0.5" BACKSTITCH, 0.5" SEAM ALLOWANCE, 0.5" TURNBACKS WHERE SHOWN, 0.13 $\pm$ 0.10" FROM EDGE, ADDITIONAL ROWS OF SEWING ARE ACCEPTABLE TO ASSIST IN ASSEMBLY

9) PHANTOM LINES REPRESENT STITCHING

10) FASTENER LOOP/HOOK MUST BE ALIGNED WITH END OF ORANGE JACKET BEFORE SEWING

PER SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBS	DART AEROSPACE LTD	
DRAWN	MBS	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	P7300-50	SHEET 10 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
		DART LONG LINE	NTS
DATE	2019-05-09	COPYRIGHT © 2019 BY DART AEROSPACE LTD	



Dart Customer Order 7302

DALL-####-FASTENER LOOP

NOTES:

- 1) MATERIAL: FASTENER LOOP A-A-55128, CL3, 1", BLACK
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1"$

X.XX = $\pm 0.01"$ / $\pm 0.5"$
 X.XXX = $\pm 0.005"$ / $\pm 0.1"$
 X.XXXX = $\pm 0.0005"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

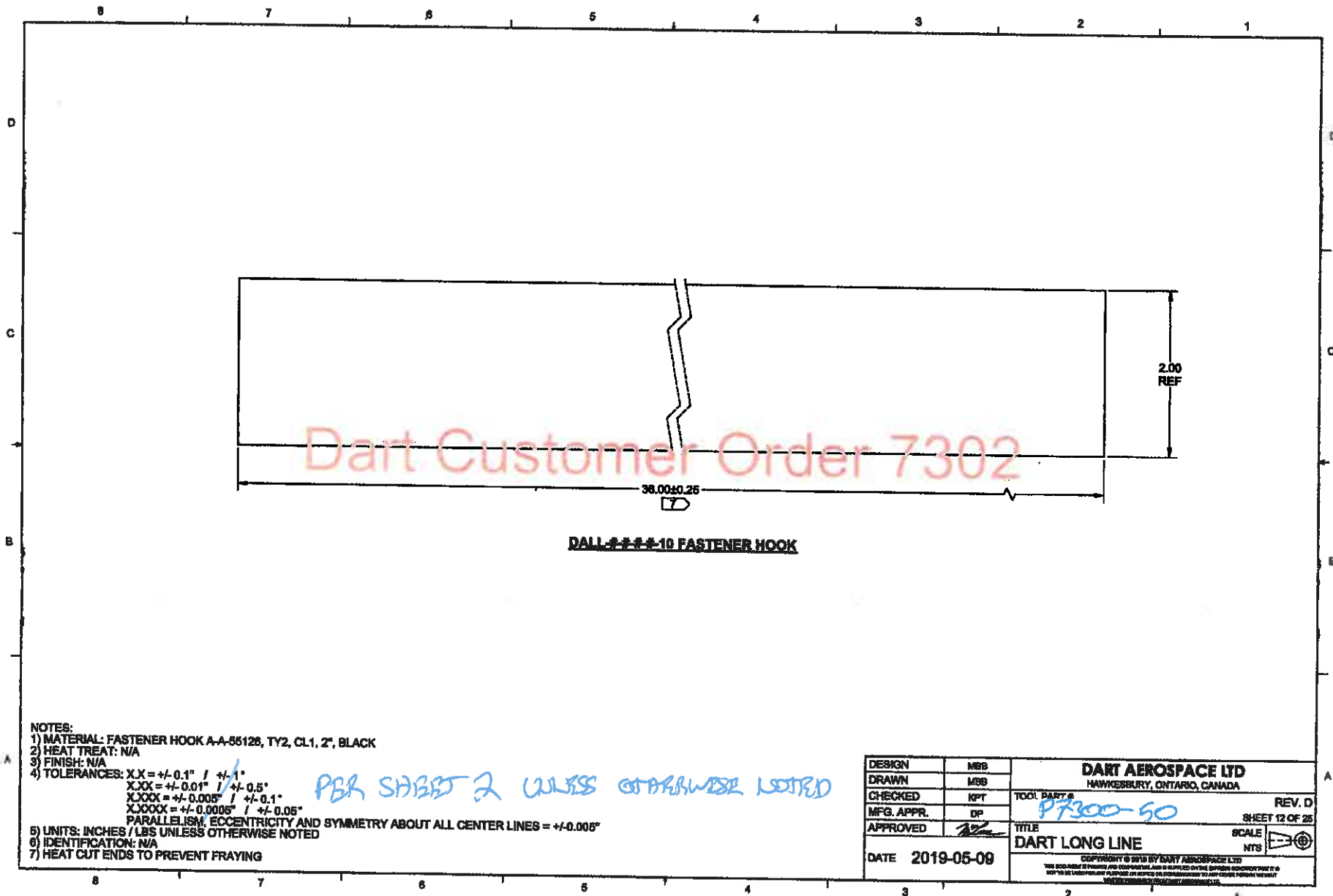
5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

6) IDENTIFICATION: N/A

7) HEAT CUT ENDS TO PREVENT FRAYING

PER SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	97300-50	SHEET 11 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DATE	2019-05-09	DART LONG LINE	NTS
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NOTES:

- 1) MATERIAL: FASTENER HOOK A-A-55126, TY2, CL1, 2", BLACK
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1^\circ$
 XXX = $\pm 0.01"$ / $\pm 0.5^\circ$
 XXXX = $\pm 0.005"$ / $\pm 0.1^\circ$
 XXXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) IDENTIFICATION: N/A
- 7) HEAT CUT ENDS TO PREVENT FRAYING

PBR SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	<i>P7300-50</i>	SHEET 12 OF 25
APPROVED	<i>AS</i>	TITLE	SCALE
		DART LONG LINE	NTS
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DALL #2-2-2-11 FASTENER HOOK

NOTES:

- 1) MATERIAL: FASTENER HOOK A-A-55128, TY2, CL3, 1", BLACK
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1^\circ$
XXX = $\pm 0.01"$ / $\pm 0.5^\circ$
XXXX = $\pm 0.005"$ / $\pm 0.1^\circ$
XXXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

6) IDENTIFICATION: N/A

7) HEAT CUT ENDS TO PREVENT FRAYING

PBR SABOT 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	<i>P7300-50</i>	SHEET 13 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
		DART LONG LINE	NTS
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8 7 6 5 4 3 2 1

D

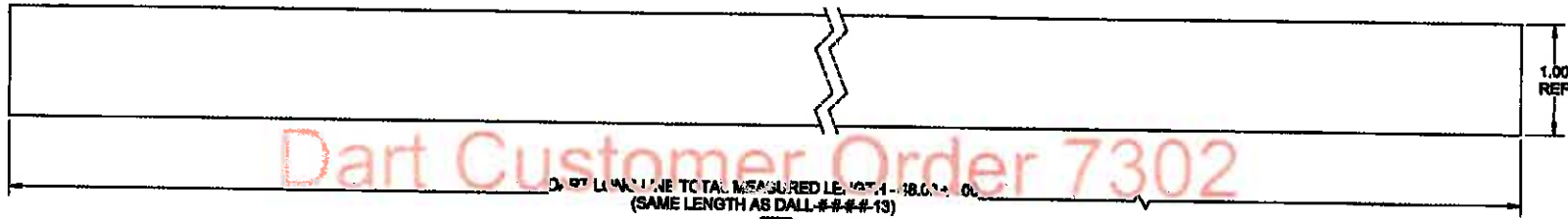
D

C

C

B

B



DALL-#-#-#-12 FASTENER HOOK

NOTES:

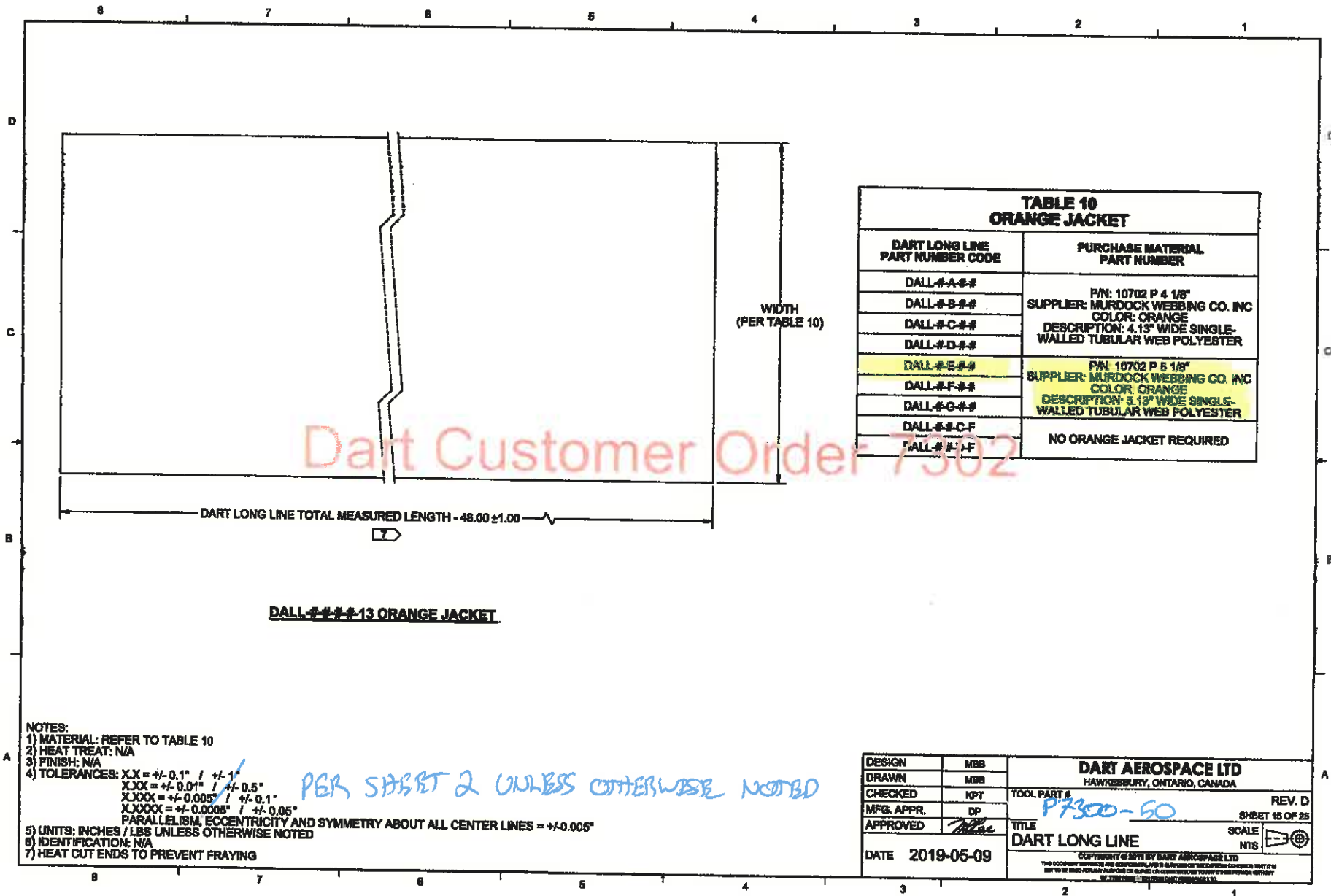
- 1) MATERIAL: FASTENER HOOK A-A-55128, TY2, CL3, 1", BLACK
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1^\circ$
XXX = $\pm 0.01"$ / $\pm 0.5^\circ$
XXXX = $\pm 0.008"$ / $\pm 0.1^\circ$
XXXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

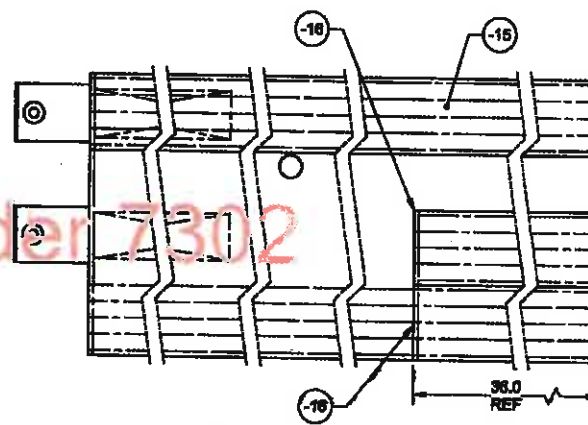
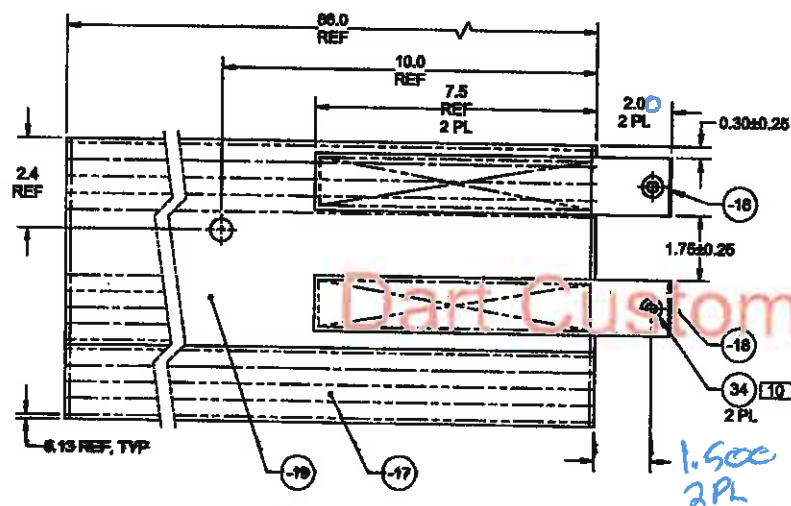
- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) IDENTIFICATION: N/A
- 7) HEAT CUT ENDS TO PREVENT FRAYING

PBR SUBMIT 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	<i>P7300-50</i>	SHEET 14 OF 25
APPROVED	<i>Mca</i>	TITLE	SCALE
		DART LONG LINE	NTS
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ITEM #	QTY	PART #	PART TITLE
-15	1	DALL-#-#-#-15	FASTENER LOOP
-16	2	DALL-#-#-#-16	FASTENER LOOP
-17	1	DALL-#-#-#-17	FASTENER HOOK
-18	2	DALL-#-#-#-18	WEBBING
-19	1	DALL-#-#-#-19	BLUE JACKET
34	2	MS20308-03 OR EQUIV.	GROMMET AND WASHER



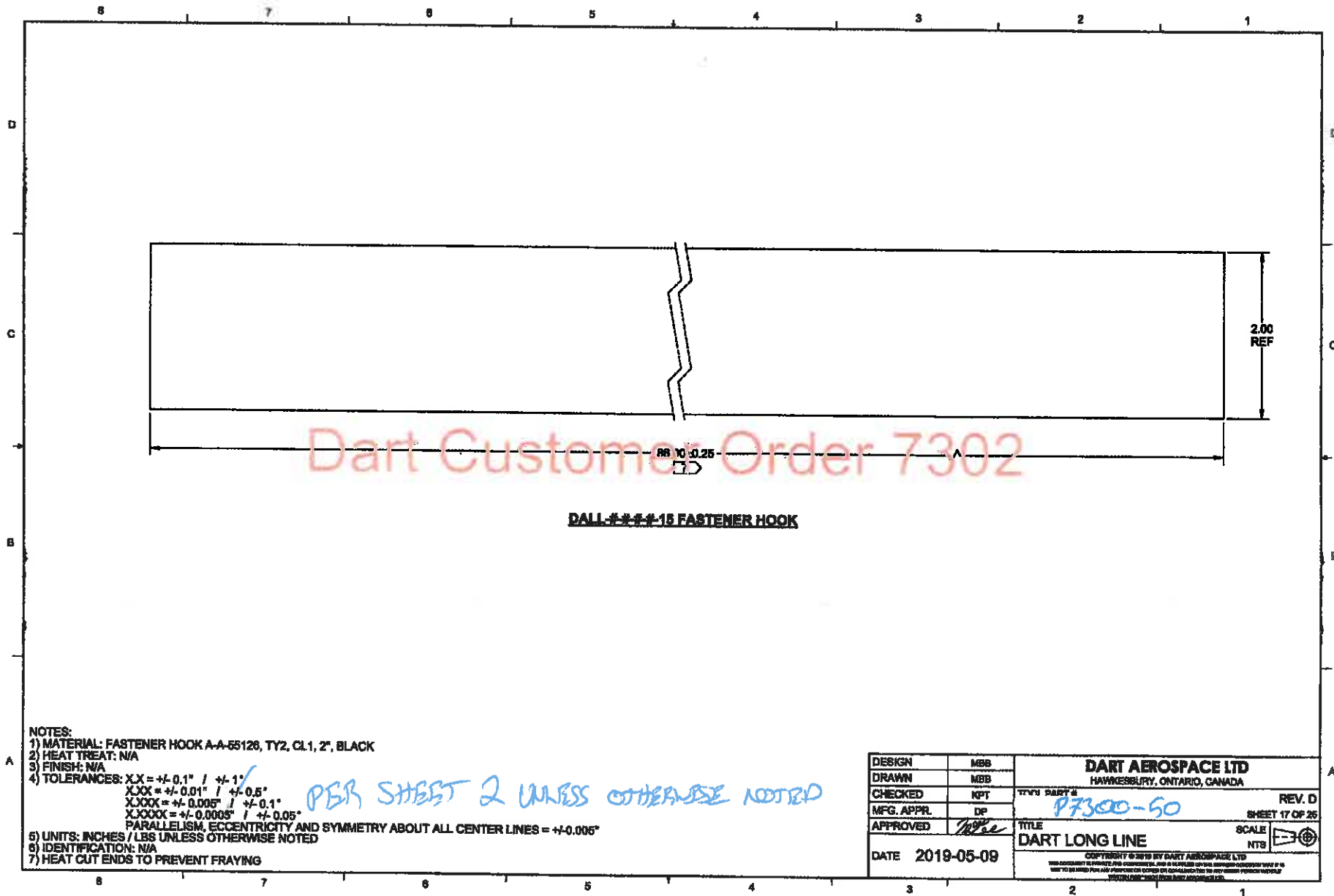
DALL-#-#-#-14 BLUE JACKET ASST
 7 8 9 11 12

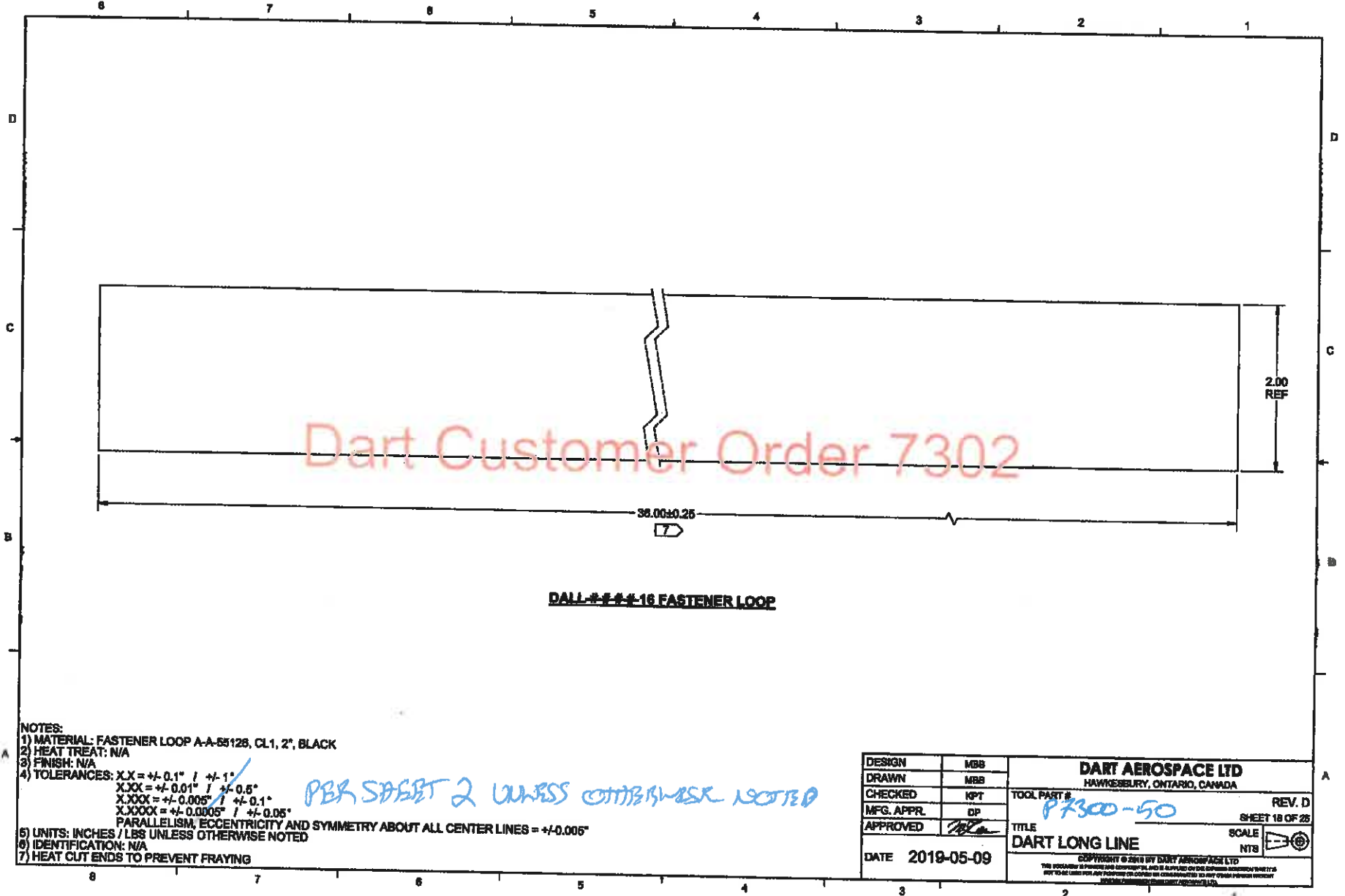
- NOTES:
 1) MATERIAL: N/A
 2) HEAT TREAT: N/A
 3) FINISH: N/A
 4) TOLERANCES

x2 7/16"
x.x = +/- 0.5"
x.xx = +/- 0.25"
x.xxx = +/- 0.100"
UNLESS OTHERWISE NOTED

- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
 6) IDENTIFICATION: N/A
 7) SEW ITEMS TOGETHER AS SHOWN
 8) STITCHING TO BE IAW ASTM D8193, TYPE 301, 6-10 STITCHES PER INCH, MINIMUM 0.5" BACKSTITCH, 0.5" SEAM ALLOWANCE.
 9) 0.5" TURNBACKS WHERE SHOWN, 0.13" ±0.10" FROM EDGE, ADDITIONAL ROWS OF SEWING ARE ACCEPTABLE TO ASSIST IN ASSEMBLY
 10) PHANTOM LINES REPRESENT STITCHING
 11) FORM ITEM 34 IN POSITION
 12) FASTENER LOOP/HOOK MUST BE ALIGNED WITH END OF ORANGE JACKET BEFORE SEWING
 13) ITEMS -15/-16/-17 MUST HAVE 3 ADDITIONAL EQUALLY SPACED ROWS OF STITCHING AS SHOWN

DESIGN	MBB	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA REV. D SHEET 10 OF 25 SCALE NTS
DRAWN	MBB	
CHECKED	KPT	
MFG. APPR.	DP	
APPROVED	<i>[Signature]</i>	TITLE DART LONG LINE
DATE 2019-05-09		COPYRIGHT © 2019 BY DART AEROSPACE LTD ALL RIGHTS RESERVED. NO PART OF THIS DOCUMENT MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM DART AEROSPACE LTD.





Dart Customer Order 7302

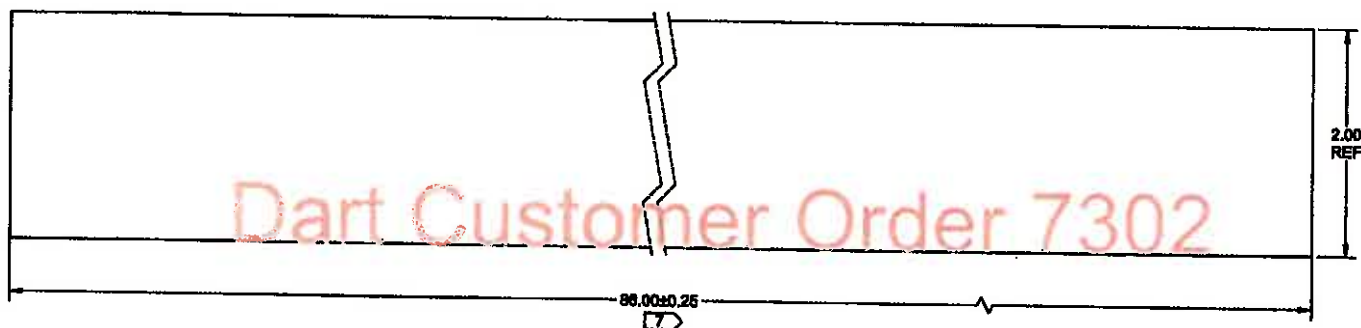
DALL-###-16 FASTENER LOOP

NOTES:

- 1) MATERIAL: FASTENER LOOP A-A-55125, CL1, 2", BLACK
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1^\circ$
X.XX = $\pm 0.01"$ / $\pm 0.5^\circ$
X.XXX = $\pm 0.005"$ / $\pm 0.1^\circ$
X.XXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$
PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$
- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) IDENTIFICATION: N/A
- 7) HEAT CUT ENDS TO PREVENT FRAYING

PER SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	P7300-50	SHEET 18 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DATE 2019-05-09		DART LONG LINE	NTS
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DALL #1-1-17 FASTENER LOOP

NOTES:

- 1) MATERIAL: FASTENER LOOP A-A-55126, CL1, 2", BLACK
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A

- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1^\circ$
 X.OX = $\pm 0.01"$ / $\pm 0.5^\circ$
 X.OOX = $\pm 0.005"$ / $\pm 0.1^\circ$
 X.OOOX = $\pm 0.0005"$ / $\pm 0.05^\circ$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

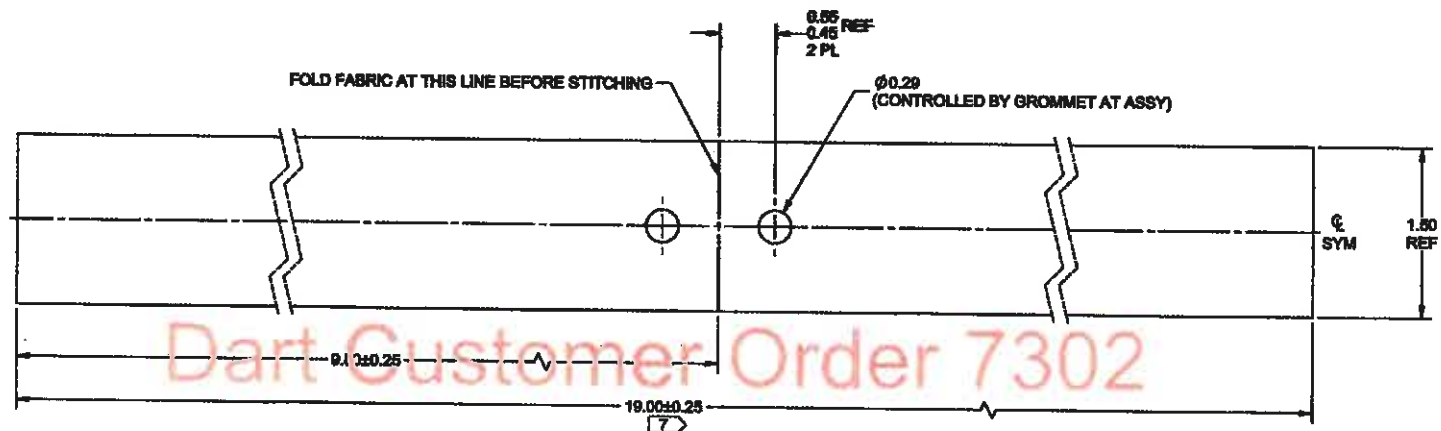
5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

6) IDENTIFICATION: N/A

7) HEAT CUT ENDS TO PREVENT FRAYING

PER SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	<i>P7300-50</i>	SHEET 18 OF 25
APPROVED	<i>MBB</i>	TITLE	SCALE
DATE	2019-05-09	DART LONG LINE	NTS
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DALL-#-#-#-18 WEBBING

NOTES:

- 1) MATERIAL: WEBBING NYLON BLACK, MIL-W-17337F, CL1, 1-1/2"
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1^\circ$

XX = $\pm 0.01"$ / $\pm 0.5^\circ$
 XXX = $\pm 0.005"$ / $\pm 0.1^\circ$
 XXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

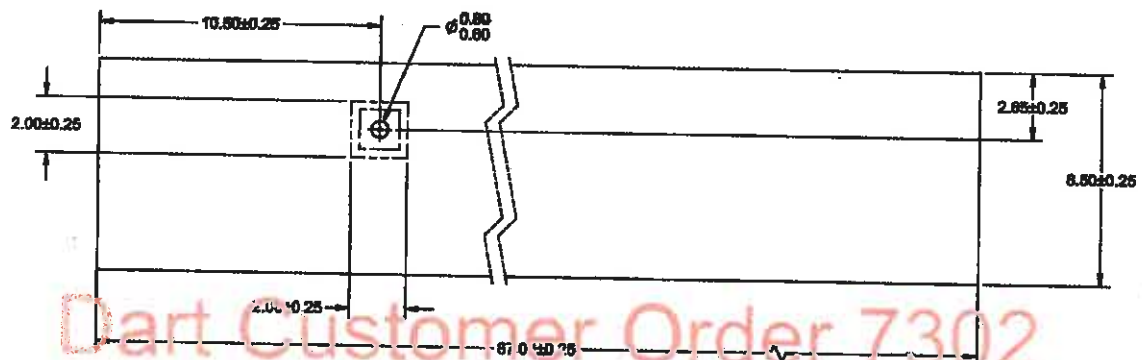
5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

6) IDENTIFICATION: N/A

7) HEAT CUT ENDS TO PREVENT FRAYING

PBR SABOT 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TRN PARTS	REV. D
MFG. APPR.	DP	P7300-50	SHEET 20 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DATE	2019-05-09	DART LONG LINE	NTS
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DALL-2-2-2-19 BLUE JACKET



NOTES:

- 1) MATERIAL: VOLANT PLUS FR-14 (BLUE # 75) (TULMAR P/N 1632B)
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1"$
X.XX = $\pm 0.01"$ / $\pm 0.5"$
X.XXX = $\pm 0.005"$ / $\pm 0.1"$
X.XXXX = $\pm 0.0005"$ / $\pm 0.05"$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) IDENTIFICATION: N/A
- 7) STITCHING TO BE IAW ASTM D8193, TYPE 301, 6-10 STITCHES PER INCH, MINIMUM 0.5" BACKSTITCH, 0.5" SEAM ALLOWANCE, 0.5" TURNBACKS WHERE SHOWN, $0.13" \pm 0.10"$ FROM EDGE, ADDITIONAL ROWS OF SEWING ARE ACCEPTABLE TO ASSIST IN ASSEMBLY
- 8) PHANTOM LINES REPRESENT STITCHING, APPLY REINFORCEMENT STITCHING AROUND HOLE APPROXIMATELY AS SHOWN

PER SHEET 2 UNLESS OTHERWISE NOTED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	P7300-50	
APPROVED	<i>[Signature]</i>	TITLE	SHEET 21 OF 25
DATE 2019-05-09		DART LONG LINE	SCALE NTS
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TABLE 11 ELECTRICAL WIRE		
DART LONG LINE PART NUMBER CODE	PURCHASE WIRE PART NUMBER (MCMMASTER CARR REF)	ELECTRICAL WIRE DESCRIPTION
DALL-#-#-A	7422K24	3 CONDUCTOR 14 GA
DALL-#-#-B	7422K26	3 CONDUCTOR 12 GA
DALL-#-#-C	7422K27	4 CONDUCTOR 14 GA
DALL-#-#-D	7422K28	4 CONDUCTOR 12 GA
DALL-#-#-E	7081K38	8 CONDUCTOR 16 GA
DALL-#-#-F	N/A	NO ELECTRICAL
DALL-#-#-G	7422K32	2 CONDUCTOR 14 GA
DALL-#-#-H	7081K18	2 CONDUCTOR 12 GA

DALL-#-#-#-20 ELECTRICAL WIRE

7

NOTES:

1) MATERIAL: ELECTRICAL CABLE MUST BE ONE OF THE FOLLOWING TYPES: SOOW / SJOW / SJTOW WIRE, REFER TO TABLE 11

2) HEAT TREAT: N/A

3) FINISH: N/A

4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1"$

X.XX = $\pm 0.01"$ / $\pm 0.5"$

X.XXX = $\pm 0.005"$ / $\pm 0.1"$

X.XXXX = $\pm 0.0005"$ / $\pm 0.05"$

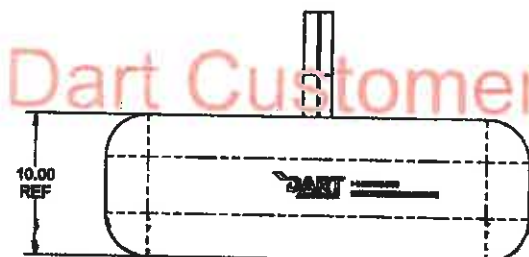
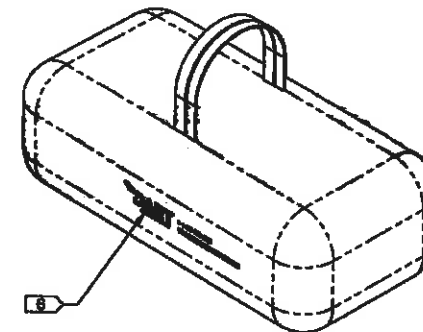
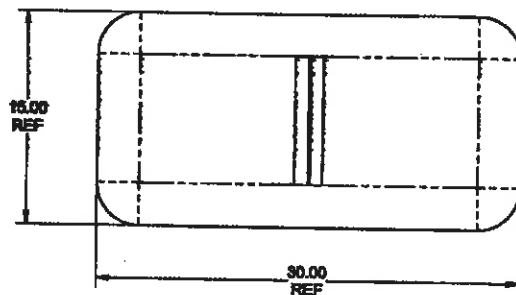
PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

6) IDENTIFICATION: N/A

7) REFER TO DALL-#-#-#-1 FOR ELECTRICAL WIRE LENGTH REQUIRED

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESSBURY, ONTARIO, CANADA	
CHECKED	KPT	TOOL PART #	REV. D
MFG. APPR.	DP	PT300-50	SHEET 22 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DATE	2019-05-09	DART LONG LINE	NTS
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Dart Customer Order 7302

DALL #2-2-1-21 DART AEROSPACE BAG

NOTES:

- 1) MATERIAL: 75-100 LITRE DUFFEL BAG, LOCAL PURCHASE OR FABRICATED
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A

- 4) TOLERANCES: XX = $\pm 0.1"$ / $\pm 1"$
 XXX = $\pm 0.01"$ / $\pm 0.5"$
 XXXX = $\pm 0.005"$ / $\pm 0.1"$
 XXXXX = $\pm 0.0005"$ / $\pm 0.05"$

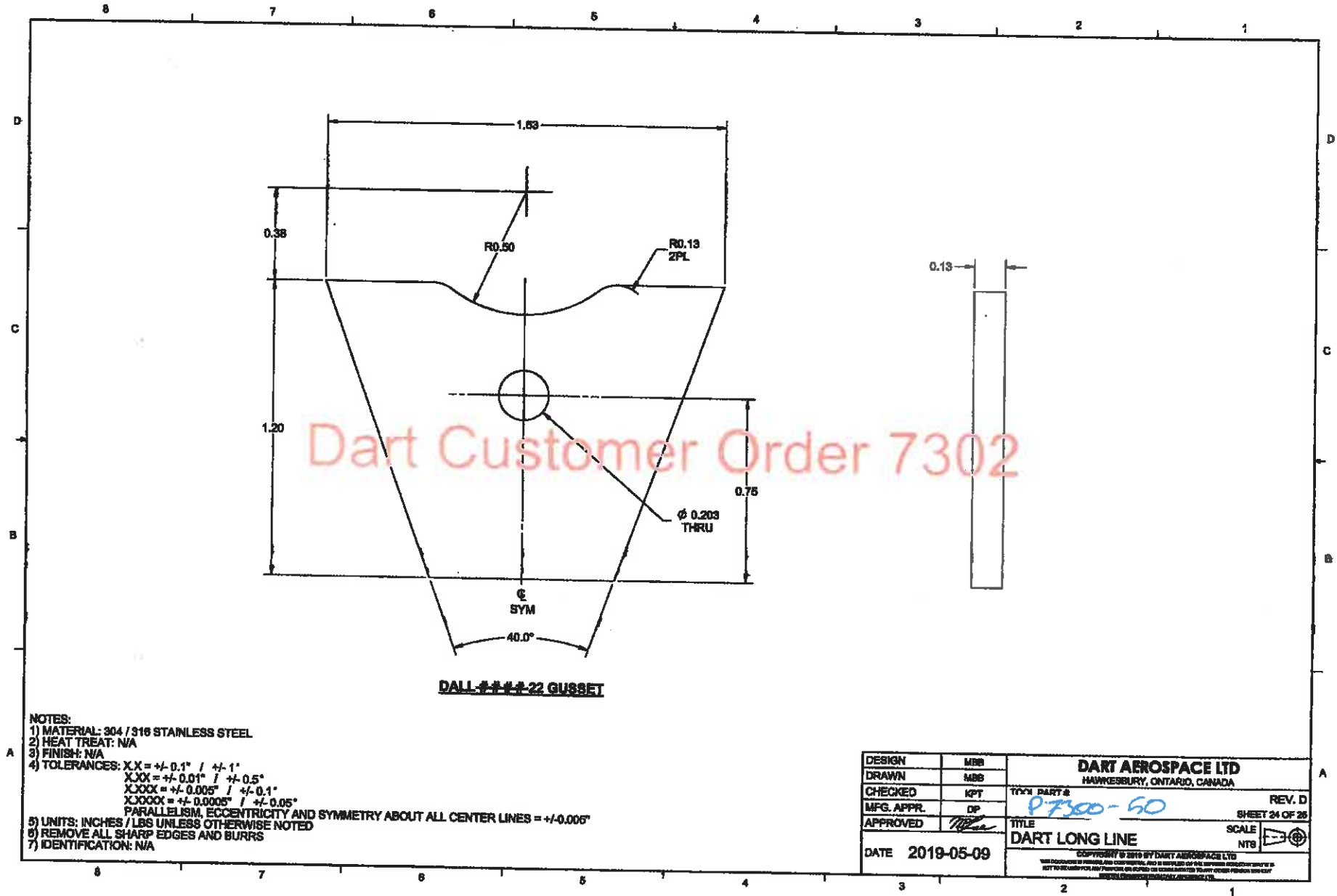
PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED

6) IDENTIFICATION: INK STAMP OR STITCH ON DART LOGO AND CONTACT INFORMATION

PER SHEET 2 UNLESS OTHERWISE NOTED

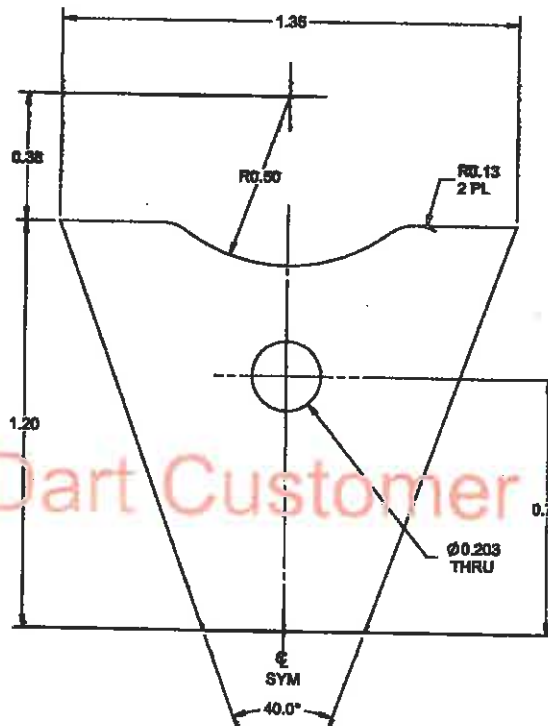
DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TITLE	REV. D
MFG. APPR.	DP	P7300-50	SHEET 23 OF 25
APPROVED	Ma	DART LONG LINE	
DATE 2019-05-09		SCALE NTS	



NOTES:

- 1) MATERIAL: 304 / 316 STAINLESS STEEL
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1^\circ$
X.XX = $\pm 0.01"$ / $\pm 0.5^\circ$
X.XXX = $\pm 0.005"$ / $\pm 0.1^\circ$
X.XXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$
PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.006"$
- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) REMOVE ALL SHARP EDGES AND BURRS
- 7) IDENTIFICATION: N/A

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TYPE PART #	REV. D
MFG. APPR.	OP	P-7300-50	SHEET 24 OF 26
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DATE	2019-05-09	DART LONG LINE	NTS
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Dart Customer Order 7302

DALL # 23 GUSSET

NOTES:

- 1) MATERIAL: 304 / 316 STAINLESS STEEL
- 2) HEAT TREAT: N/A
- 3) FINISH: N/A
- 4) TOLERANCES: X.X = $\pm 0.1"$ / $\pm 1^\circ$
X.XX = $\pm 0.01"$ / $\pm 0.5^\circ$
X.XXX = $\pm 0.005"$ / $\pm 0.1^\circ$
X.XXXX = $\pm 0.0005"$ / $\pm 0.05^\circ$

PARALLELISM, ECCENTRICITY AND SYMMETRY ABOUT ALL CENTER LINES = $\pm 0.005"$

- 5) UNITS: INCHES / LBS UNLESS OTHERWISE NOTED
- 6) REMOVE ALL SHARP EDGES AND BURRS
- 7) IDENTIFICATION: N/A

DESIGN	MBB	DART AEROSPACE LTD	
DRAWN	MBB	HAWKESBURY, ONTARIO, CANADA	
CHECKED	KPT	TOTAL PARTS	REV. D
MFG. APPR.	DP	P7300-50	SHEET 28 OF 25
APPROVED	<i>[Signature]</i>	TITLE	SCALE
		DART LONG LINE	NTS
DATE	2019-05-09	COPYRIGHT © 2019 BY DART AEROSPACE LTD	



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER **POHB043732**



Supplier: TUL001-VC
Tulmar Safety Systems
1123 Cameron St
Hawkesbury
ON
K6A 2B8 Canada
Phone: 613 632 1282
Fax: 613 632 2030

Attention: McGillis, Anna

Ship To: 1270 Aberdeen Street
Hawkesbury
ON
K6A 1K7 Canada
Phone: 613-632-5200

PO No: POHB043732
PO Date: 6/14/19
Due Date: 8/9/19
Purchase Order
Revision:
Revision Date:
Ship-To Contact: Phone:

Via: Ground
Pymt Terms: Net 30
Freight Terms:
Special Comments:

Items													
Line Item	Job	Part	Supplier Part No	Item No	Description	Status	Account	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
1	190539 14777	P7300-50P			Plasma® Long Line 7,300 lbs Safe Work Load (3,300 kg) REV D	Firmed		8/9/19	10 pcs	0 pcs	10 pcs	\$1,253.18/pcs	\$12,531.80
10 X AUG 12 2019 DAS 61 9-89													
Line Item Note Please built P7300-50 AS per accordance deviation (Dart will supply the plasma Rope to A.B) Nothing change for Tulmar , built as per REV D													
Grand Total:												\$12,531.80	

Order Notes

Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Procurement Quality Clauses
 A005 RIGHT OF ENTRY
 A007 FIRST ARTICLE INSPECTION (FAI) BY SELLER, (DOCUMENTATION MAINTAINED BY SUPPLIER)
 A012 CHEMICAL AND PHYSICAL TEST REPORTS
 A016 PERSONNEL QUALIFICATION
 A017 RAW MATERIAL IDENTIFICATION (AS APPLICABLE)
 A026 CERTIFICATION OF MATERIAL CONFORMANCE
 A041 QUALITY MANAGEMENT SYSTEM
 A042 DART NOTIFICATION BY SUPPLIER
 A043 RETENTION OF QUALITY DOCUMENT
 A048 COUNTERFEIT PARTS AVOIDANCE, DETECTION, MITIGATION AND DISPOSITION PROGRAM
 A049 SUPPLIER AWARENESS

Plex 7/11/19 12:36 PM dart.lussier.patrick

PACKING SLIP

TULMAR

Tulmar Safety Systems Inc.
1123 Cameron Street
Hawkesbury, ON K6A 2B8
Tel: 613-632-1282
Fax: 613-632-2030
GST R132478223
MID : XOTULSAF1123HAW
email: info@tulmar.com

Packing Slip No Page

66993 1

Ship Date
8/9/2019

Bill To:

Dart Aerospace
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Canada

Ship To:

Dart Aerospace
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Canada

Order number	Sales order date	Account number	Loc	Account manager
37288	6/14/2019	CDART100	H	Vicky Eve Lovvorn
PO number	Ship via	Shipping Terms		
HB043732 ✓	Pick-Up	FOB ORIGIN		

Item No. Description	Quantity ordered	UOM	Qty Shipped/Returned	Quantity on back order
87402-003 Long Line, 50ft, 5/8" Rope Drawing No: DALL-50-E-B-A-1 DWG Rev: D DEVIATION: Plasma Line / Braid Call to P7300-50 ✓ SF #47902	10.00 ✓	EA	10.00	
Lot no.: BATCH0000000001	10.00			

MISC OM Misc Other Mfg	1.00	EA	1.00	
Fee for Deviation & Labor for PO Error				

RECEIVED

AUG 09 2019

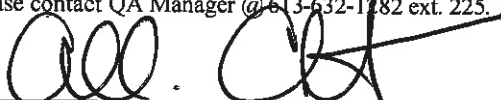
DART AEROSPACE LTD.

Certificate of Conformance

☐ See Certification Enclosed

I hereby certify that the items listed hereon have been inspected, and / or tested (as applicable), conform to all specifications and requirements detailed in the contract or purchase order. Objective evidence to support this statement is on file, and can be made available upon request.
If any questions or concerns, please contact QA Manager @ 613-632-1282 ext. 225.

Authorized Inspector



Date: **AUG 09 2019**

UK

Oct 21/19

19-7437.

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only



Job: <u>197719</u>		DISPOSITION		DEPARTMENT/PROCESS			
Part No. <u>P7300-50</u>		Rework ☐ Scrap ☐ Use-as-is ☒		Skid-tube ☐ Machining ☐ Large Fab ☐	Cross tube ☐ Small Fab ☐ Finishing ☐	Eng. (Non-AW) ☒ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐	Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐
Date: <u>July 12, 2019</u>	Sequence #:		QTY Affected: <u>10</u>		MNB (CS1042) <u>MNB</u> July 12, 2019		
Description Work Order Deviation			Disposition		Completed By <u>Alain Pat</u> Lead hand / Supervisor DAS 30 9-89 OCT 11 2019 QC / QA Coordinator <u>CS</u> 9-89 OCT 11 2019		
P7300-50 has been manufactured in accordance with the attached (hand marked up) drawing P7300-50 Rev. D Customer request (order 7302)			This deviation is acceptable. The Plasma material has higher strength properties compared to he Dyneema material. The Long Lines made on this W/O must be supplied to customers with the revised OM-SLP Rev. 11 Manual.				
Root Cause Operator ☐ Manufacturing Process ☒ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐			FAULT CATEGORY ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Power Loss/Surge ☐ Follo/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set/Set-up ☐ Positioned Wrong ☐ Outside Tolerance ☒ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread				
Other/Details:							